Abstracts

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T. SASAKI and T. YAMADA: **Shrinkage Stress of Wood II, On the Application to the Superposition Method**, MOKUZAI GAKKAISHI, 18, 169 (1972).

In this paper an attempt was made to interpret shrinkage stress of wood as one of the viscoelastic phenomena under the non-equilibrium states of moisture. For this purpose, Hinoki specimens with the initial moisture content of 14.43 % were dried under restraint at 20°C and 45 % relative humidity, and the resultant shrinkage stresses were measured in radial and tangential direction. Since the experimental curves could not be described by the elastic equation, the viscoelastic equation was derived by using Boltzmann's superposition method and applying Takemura's expression for the stress relaxation of wood during desorption. The values calculated from this equation agreed well with those obtained from experiments. On the other hand, the degree of anisotropy in shrinkage stress seemed to be predicted by the elastic equation.

T. YAMADA: **Rheology of Wood, Rheology (Japan), 1**, 104 (1972).

Reviews literature on the problem of the viscoelastic properties of wood, the formation of wood and rheology, and the anisotropy of viscoelasticity on wood. The references to literature are limited to recent paper.

T. YAMADA, K. SUMITA, M. MORIMOTO, T. SASAKI, Y. HASEGAWA, T. OHGAMA, T. AOKI and M. MORI: **Short Manual on Wood Mechanics VIII, Wood Research Review**, No. 6, 50 (1972).

T. MAKU: **Longtime Performance of Plywood Wall Panel, Wood Research Review**, No. 6, 1 (1972).

Experimental plywood wall panels were tested for rigidity and strength during 2 years outdoor exposure. The plywood were nailed, nail-glued and press-glued to the wood frames.

T. MAKU: **Trees in the Su'tra, Wood Research Review**, No. 6, 9 (1972).

Informations on significances and properties of trees in the Su'tra were given.

T. YAMASAKI and T. HIGUCHI: ***p*-Hydroxyphenyl Component of Grass Lignin**, MOKUZAI GAKKAISHI, 17, 117 (1971).

Milled wood lignins (MWL) of grasses were methylated and subjected to permanganate and hydrogen peroxide oxidation successively. The aromatic carboxylic acids of degradation products of the grass lignins were methylated with diazomethane in methanol and analyzed by gas-liquid chromatography. The chromatograms showed the presence of a considerable amount of 2, 3, 2′-trimethoxybiphenyl-5, 5′-dicarboxylic acid, 2, 3-dimethoxydiphenyl ether-5, 4′-dicarboxylic acid and 2, 2′-dimethoxydiphenyl ether-5, 4′-dicarboxylic acid which could not be found in the degradation products of softwood and hardwood lignins, indicating a peculiar structural feature of the grass lignins.

T. HIGUCHI: **Formation and Biological Degradation of Lignins**, Advances in Enzymology, 34, 207 (1971), John Wiley & Sons, Inc.

ABSTRACTS

Investigations on the lignin formation by tracer experiments, role of shikimate-cinnamate pathway, dehydrogenation of *p*-coumaryl alcohols and enzymes in lignification were reviewed and discussed. Recent progress on the study of *O*-methyltransferases by which syringyl lignin is differentiated from guaiacyl lignin was described. Mechanism of biological degradation of lignin, the role of laccase and β-etherase in lignin depolymerization, and biological fission by wood destroying fungi were also reviewed and discussed.

T. HIGUCHI: **Biosynthesis of Cell Wall Constituents**, Growth and Movements (SHOKUBUTSU SEIRI KOZA 3), p. 32 (1971), Ed. by M. FURUYA, S. MIYACHI and A. KUMURA, ASAKURA SHOTEN.

Metabolism of nucleoside diphosphate sugars, shikimic acid, phenylalanine and cinamic acids were outlined, and recent investigations on metabolic pathways leading to the biosynthesis of cellulose, hemicelluloses and lignins were reviewed and discussed in detail.

T. HIGUCHI, M. TANAHASHI and A. SATO: **Acidolysis of Bamboo Lignin. I, Gas-liquid Chromatography and Mass Spectrometry of Acidolysis Monomers**, MOKUZAI GAKKAISHI, 18, 183 (1972).

Gas-liquid chromatography and mass spectrometry of TMS derivatives of acidolysis monomers of a bamboo MWL indicated that both guaiacylglycerol- and syringylglycerol-β-aryl ether components are present almost equally in the lignin, and that the amount of both components is estimated to be 50~60 % of phenylpropane units of the lignin. β-Oxysinapyl alcohol, 2-hydroxy-1-(4-hydroxyphenyl)-1-propanone, 1-hydroxy-1-(4-hydroxyphenyl)-2-propanone and *p*-hydroxyphenyl acetone which had not been found were originally identified in the acidolysis products of the bamboo MWL.

A. SATO, T. KITAMURA and T. HIGUCHI: **NMR-Analysis of TMS-Phenolic Compounds**, MOKUZAI GAKKAISHI, 18, 253 (1972).

Trimethylsilyl (TMS) derivatives of fifteen kinds of polyphenolic compounds related to lignin-structure were analyzed by NMR in the solution of carbon tetrachloride. The peaks due to carboxylic-, phenolic- and alcoholic-TMS groups which appeared at high magnetic shielded-range (δ =0.3 to 0.0 ppm) were clearly distinguished, respectively. The values of chemical shifts due to the protons of carboxilic-, phenolic- and alcoholic-TMS groups from that of the methyl peak (δ =1.17 ppm) of *tert*-buthanol which was added as internal standard were as follows: 53±3 (0.29), 59±2 (0.19) and 64±2 Hz (0.10 ppm). The peak appeared at 68±1 Hz from *tert*-buthanol, which had been presumed to be a decomposed product from TMS derivatives, was established as a hexamethyldisiloxane.

M. SHIMADA, T. FUKUZUKA and T. HIGUCHI: **Ester Linkages of *p*-Coumaric Acid in Bamboo and Grass Lignins**, Tappi, 54, 72-78 (1971).

Milled-wood lignins (MWL) from a bamboo and grasses showed characteristic pH-UV absorbancy curves corresponding to the ester of *p*-coumaric acid. Infrared spectra of dehydrogenation polymers (DHP) formed in buffer solutions with organic acids showed the absorption band of an ester carbonyl group of 1730 cm^{-1}. On the other hand, no significant band due to ester carbonyl was observed in the IR spectra of DHP formed in distilled water. Labeled acetic, cinnamic, and ferulic acids were individually incorporated into DHP in variable amounts. Even on drastic methanolysis, thioglycolic acid treatment and catalytic hydrogenolysis of bamboo MWL,

p-coumaric acid was not liberated from the lignin polymer. The analytical data indicate that the majority of *p*-coumaric acid molecules in bamboo and grass lignins are linked to the terminal γ-carbon of the side chain in the lignin molecule.

M. SHIMADA, H. FUSHIKI and T. HIGUCHI: **O-Methyltransferase as a Key Enzyme in Biosynthesis of Guaiacyl and Syringyl Lignins**, MOKUZAI GAKKAISHI, 18, 43 (1972).

Gymnospermous *O*-methyltransferase (OMT) was for the first time extracted from seedlings of Japanese black pine and ginkgo shoots. These gymnospermous enzymes were found to be able to methylate caffeic acid to ferulic acid (guaiacyl lignin precursor) but scarcely methylated 5-hydroxyferulic acid to sinapic acid (syringyl lignin precursor). This is in sharp contrast to the finding that all angiosperous OMT's tested are able to methylate both caffeic acid and 5-hydroxyferulic acid. The differences in the methoxyl patterns between angiosperm and gymnosperm lignins were principally explained in terms of the differences of the substrate specificities of plant OMT's.

K. KITAO: **Dimeric Flavonoids, Wood Review**, No. 6, 34 (1972).

Recent developments in the chemistry of biflavonyls and biflavanes are reviewed from 54 literatures.

The 23rd Public Lecture held by Wood Research Institute (May 19, 1972, Osaka).

T. SASAKI: Shrinkage and Swelling Stress of Wood.

K. SUMIYA: On the Formation of Wood under Restraint.

T. HIGUCHI: Chemistry of Hardwood Lignin.